

Supplementary Material for

The effect of activity and face masks on exhaled particles in children

Peter P. Moschovis, Jesiel Lombay, Jennifer Rooney, Sara R. Schenkel, Dilpreet Singh,
Shawheen J, Rezaei, Nora Salo, Amanda Gong, Lael M. Yonker, Jhill Shah, Douglas Hayden,

Patricia L. Hibberd, Philip Demokritou, T. Bernard Kinane

Table S1 Room baseline particle concentration

Variables	Value
Particle concentration (cm ⁻³)	
Mean (SD)	1.092 (0.634)
Median (IQR)	1.097 (0.575-1.687)
Particle size (µm)	
Mean (SD)	1.736 (0.201)
Median (IQR)	1.738 (1.655-1.805)

Table S2 Average particle concentration (cm⁻³) of particles ≤ 5 µm (95% CI)

Activity	None	Cloth	Surgical	<i>P</i>
Breathe	1.272 (0.931, 1.613)	1.284 (1.035, 1.534)	1.149 (0.905, 1.394)	0.028
Speak	1.312 (0.978, 1.653)	1.460 (1.164, 1.756)	1.234 (0.982, 1.488)	0.002
Sing	1.377 (1.042, 1.712)	1.399 (1.106, 1.691)	1.212 (0.975, 1.449)	0.044
Cough	1.726 (1.264, 2.188)	1.653 (1.351, 1.956)	1.324 (1.076, 1.572)	0.028
Sneeze	5.170 (1.899, 8.441)	2.803 (1.853, 3.752)	2.371 (1.114, 3.637)	0.026
<i>P</i>	0.0002	<0.0001	0.009	

P-value calculated by one-way repeated measures ANOVA

Table S3 Mean particle diameter (µm) by mask and activity (95% CI)

Activity	None	Cloth	Surgical	<i>P</i>
Breathe	1.634 (1.527, 1.740)	1.588 (1.492, 1.683)	1.615 (1.533, 1.696)	0.269
Speak	1.660 (1.555, 1.764)	1.536 (1.431, 1.640)	1.565 (1.476, 1.655)	0.0003
Sing	1.651 (1.548, 1.755)	1.500 (1.409, 1.590)	1.565 (1.486, 1.643)	<0.0001
Cough	1.554 (1.459, 1.649)	1.510 (1.420, 1.601)	1.551 (1.451, 1.651)	0.214
Sneeze	1.415 (1.314, 1.516)	1.428 (1.327, 1.529)	1.451 (1.341, 1.562)	0.579
<i>P</i>	<0.0001	<0.0001	<0.0001	

P-value calculated by one-way repeated measures ANOVA

Table S4 Pairwise mean difference in particle number (cm⁻³) by mask and activity

Mask	Activity	Absolute Difference	Bonferroni Adjusted 95% CI	Relative Difference
Cloth - None	Breathing	0.013	(-1.981, 2.008)	1.0%
Surgical - None	Breathing	-0.125	(-2.119, 1.870)	-9.7%
Cloth - None	Speaking	0.159	(-1.861, 2.179)	12.0%
Surgical - None	Speaking	-0.067	(-2.087, 1.953)	-5.1%
Cloth - None	Singing	0.033	(-1.987, 2.053)	2.3%
Surgical - None	Singing	-0.154	(-2.174, 1.866)	-11.1%
Cloth - None	Coughing	-0.065	(-2.060, 1.929)	-3.8%
Surgical - None	Coughing	-0.403	(-2.398, 1.592)	-23.2%
Cloth - None	Sneezing	-2.365	(-4.360, -0.371)	-45.6%
Surgical - None	Sneezing	-2.802	(-4.796, -0.807)	-54.1%
None	Speaking - Breathing	0.045	(-1.950, 2.039)	3.5%
None	Singing - Breathing	0.107	(-1.888, 2.102)	8.3%
None	Coughing - Breathing	0.455	(-1.540, 2.449)	35.4%
None	Sneezing - Breathing	3.898	(1.903, 5.893)	303.4%
Cloth	Speaking - Breathing	0.190	(-1.830, 2.210)	14.7%
Cloth	Singing - Breathing	0.126	(-1.894, 2.146)	9.7%
Cloth	Coughing - Breathing	0.376	(-1.619, 2.371)	29.0%
Cloth	Sneezing - Breathing	1.520	(-0.475, 3.514)	117.1%
Surgical	Speaking - Breathing	0.102	(-1.918, 2.122)	8.8%
Surgical	Singing - Breathing	0.078	(-1.942, 2.097)	6.7%
Surgical	Coughing - Breathing	0.176	(-1.819, 2.171)	15.2%
Surgical	Sneezing - Breathing	1.221	(-0.774, 3.216)	105.3%

Estimates from mixed effects model with mask, activity, and mask × activity as fixed effects, and participant as random effect; 95% CI includes Bonferroni correction for multiple comparisons.

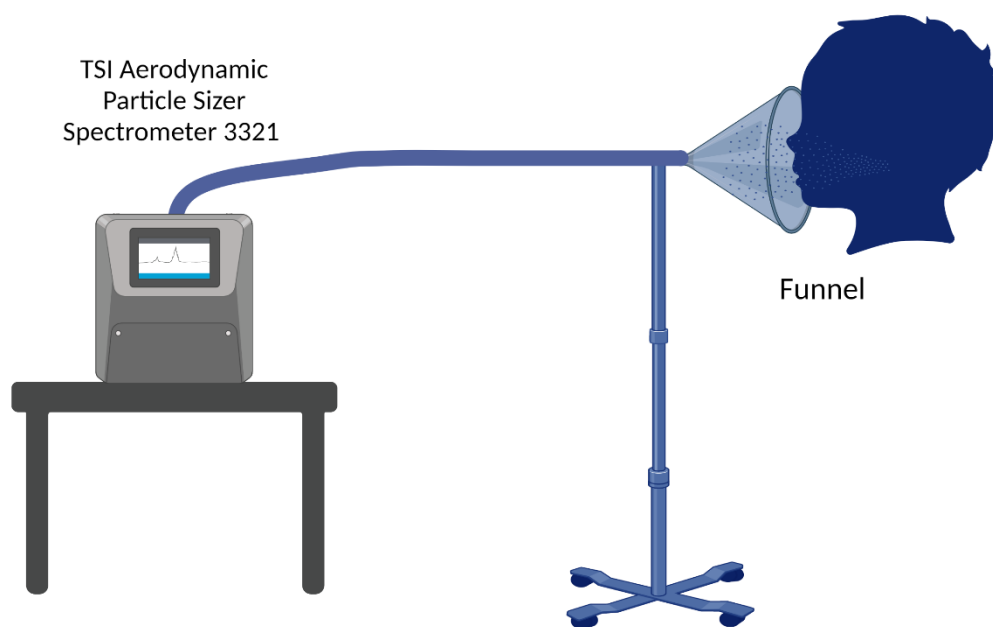


Figure S1 Aerosol sampling equipment used in study

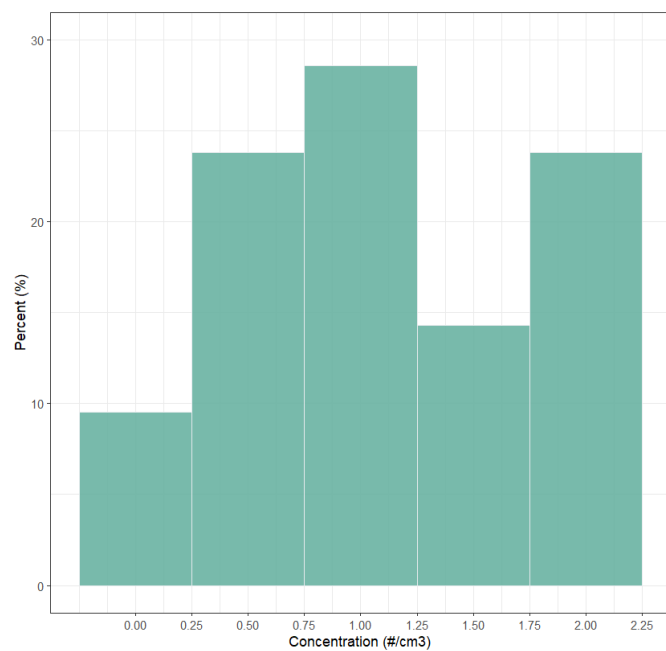


Figure S2 Distribution of room baseline particle concentration (cm^{-3})

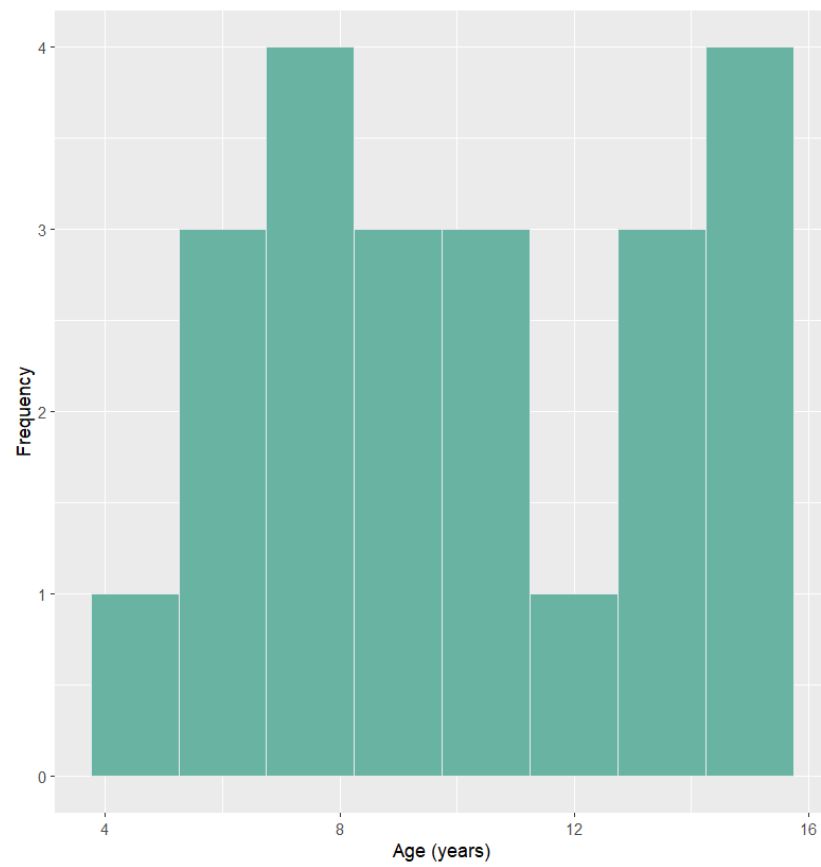


Figure S3 Distribution of participant ages

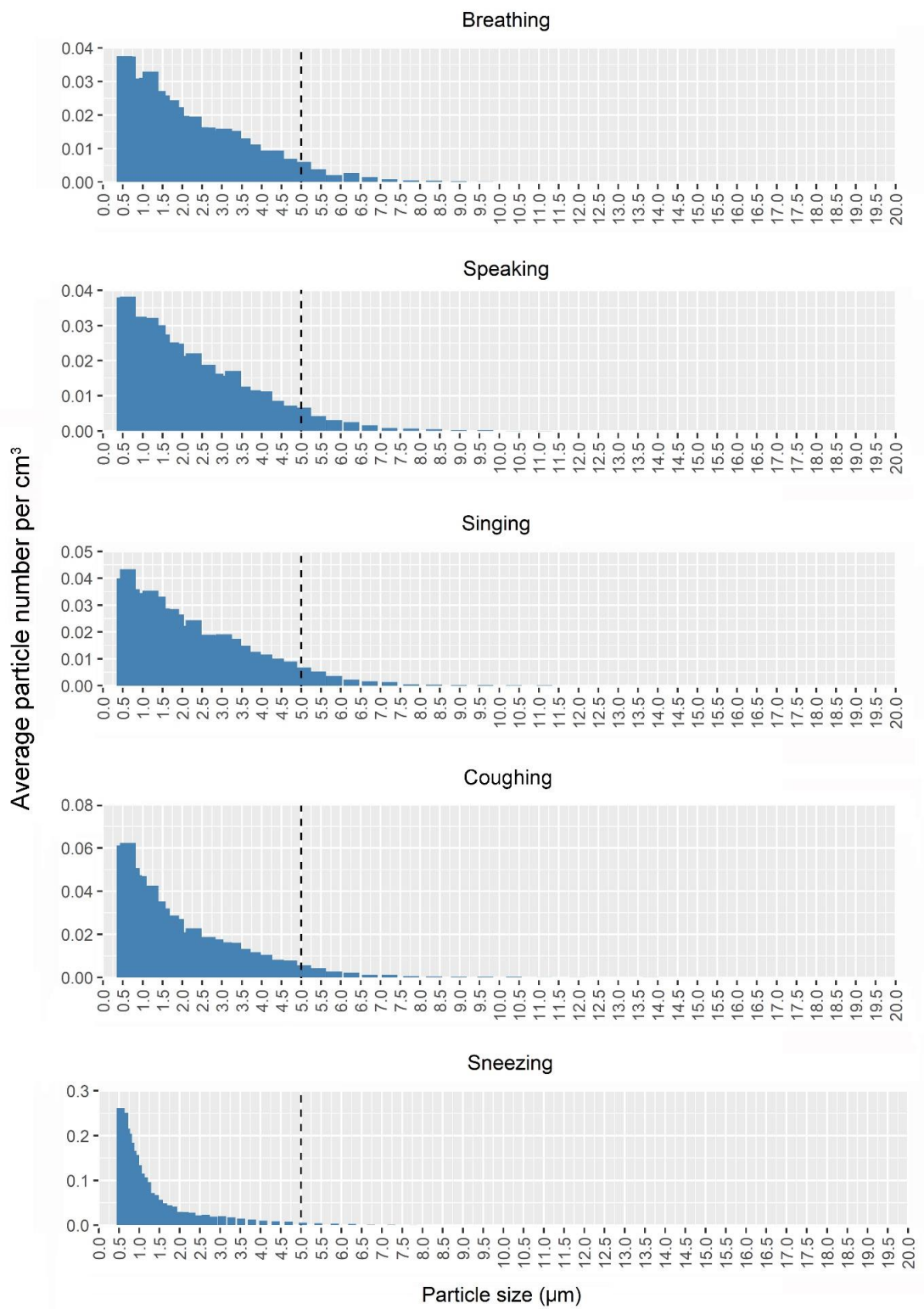


Figure S4 Particle size distribution across activities while unmasked for each activity.